CTS Student Online Assessment Pilot Study: An Exploration of The Learning Manager (TLM) Model With Red Deer College

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Prepared by:
Alberta Education
Accountability & Reporting Division
System Improvement Group
September 2009

For more information contact:
Todd Eistetter at (780)644-1156 or Todd.Eistetter@gov.ab.ca

This document is intended primarily for:
System and School Administrators
Education Stakeholders
Post-Secondary Institutions
Alberta Education Executive Team and Managers
Career and Technical Studies (CTS) Teachers
Parents
Community Members

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Executive Summary

3400 level Career and Technical Studies (CTS) courses were developed to be taken by Alberta high school students who have the prerequisite skills and interest required to complete first period apprenticeship courses (3400 series). These 1st period apprenticeship courses permit a student to work towards journeyman credentialing in a specific trade area, which is explained in detail in the *Alberta Journeyman Certification Explanation* section of this study on P. 13.

Red Deer College (RDC) under the Regional Trades Initiative has developed a program for CTS teachers and students that provides (1) professional learning opportunities for certified teachers to improve upon their practical skills and theoretical knowledge in carpentry and welding, and (2) a separate and standardized student assessment tool of the theoretical component of the 3400 1st period apprenticeship program in carpentry and welding using The Learning Manager (TLM) online platform. This study focuses upon use of TLM as a standardized assessment tool. A detailed explanation of the background of TLM is provided in *Appendix A* on P. 33 of this study.

In February 2009 the System Improvement Group, Alberta Education and RDC, began a pilot using a small number of high schools that used the TLM Online Student Assessment Program. TLM had been adapted by RDC for carpentry and welding in the new 3400 1st period apprenticeship courses. This pilot was conducted to determine the relevance, benefits and challenges of high school student online standardized assessment using a carpentry and welding apprenticeship model that follows the second component of the RDC program described above.

The pilot was based on the current CTS Program of Studies (POS) and mapped the new 3400 1st period courses that are to be implemented in September 2009, as TLM is built using the 3400 courses. Students completed 3400 level courses and were credited with courses from the current POS. The pilot was intended to examine the standardized assessment opportunities of TLM and not the new 3400 level courses. A map of the current POS courses and the 3400 level courses is provided in *Appendix B* on P. 38 of this study.

System Improvement Group through work on the *CTS Student Assessment Framework Project* as part of the larger *CTS Initiative* managed by Curriculum Branch, Program and Development Standards Division, Alberta Education has collaborated with RDC to pilot TLM in four high schools and one outreach school. This pilot was offered to determine the relevance, benefits and challenges of high school student online standardized assessment using a carpentry and welding apprenticeship model.

The specific areas that this online student assessment pilot was to examine included:

1. Determining the impact of standardized student assessment upon opportunities for student success which potentially narrows the gap between schools of subjective teacher-awarded marks.
2. Determining the value of this online assessment tool for potential use by non-journeyman CTS teachers.
3. Assessing the impact of this online assessment tool upon student achievement.
4. Assessing the impact upon student and teacher perception of the online tool.
5. Determining the potential for future expansion of this tool beyond the initial pilot schools.

6. Determining the value of a specific student achievement measure in the Student Assessment Framework.

The study *Key Findings* and *Recommendations* are presented in a chart format to indicate their relative correspondence.

Study Key Findings	**Recommendations**
The pilot conducted for this study had a small number of schools; teachers and students participating that limited the available data and consequently the overall findings.	That Alberta Education pursues a partnership with Red Deer College to expand use of The Learning Manager online student assessment program into a larger pilot opportunity with additional high schools.
Some participating pilot study teachers expressed an interest in continued use of the TLM online standardized student assessment tool regardless of the status of financial support for the resource from Alberta Education.	That Red Deer College examine opportunities to provide The Learning Manager to school authorities in Alberta through agreements as a tool to provide additional resources and standardized assessment for CTS teachers at the 3400 level of programming.
Teachers, both pilot study teachers and teachers in subject areas at the study schools not associated with the study, expressed interest in expanding the TLM standardized student assessment tool to trade areas beyond carpentry and welding and academic subjects.	That Red Deer College and/or other post-secondary institutions continues work to expand TLM beyond the two trades areas of carpentry and welding examined in this pilot into other 1st period apprenticeship programs.
Teachers expressed interest in expanding the TLM standardized assessment tool to CTS courses at the introductory, intermediate and advanced levels to assist in addressing the significant grading differences and the gap between students' earned marks and their actual abilities.	That Alberta Education and Red Deer College examine the opportunity to expand The Learning Manager online student assessment program or other online student assessment program to CTS courses at the introductory, intermediate and advanced levels.
There are challenges experienced by schools in providing facilities capable of providing courses at the 3400 level 1st period apprentice and hiring teachers who are also certified journeyman and able to teach to that level.	That Alberta school authorities be actively encouraged by Alberta Education to explore partnerships and shared facility agreements with neighboring school authorities and post-secondary institutions to more effectively utilize programs, facilities, resources and personnel.

A majority of CTS teachers are not certified at the journeyman level and therefore those students that register in 3400 level courses with these teachers are unable to challenge 1st period journeyman exams through Apprenticeship and Industry Training (AIT), Alberta Advanced Education and Technology.	That Alberta Education continue dialogue with Apprenticeship, Industry and Training (AIT), Alberta Advanced Education and Technology to address the status of students who complete the 3400 level courses through the instruction offered by a non-journeyman CTS teacher and their ability to write 1st period journeyman exams.
The mandate of Red Deer College to serve the Central Alberta region and the number of available personnel and technological resources that they currently possess pose a challenge for the possible expansion of TLM to additional high schools	That Alberta Education explores the opportunity with Red Deer College to assume a central leadership role in the future use of The Learning Manager online student assessment program through direct management of the process.

CTS Student Online Assessment Pilot Study: An Exploration of The Learning Manager (TLM) Model With Red Deer College

Background

Red Deer College under the Regional Trades Initiative has developed a program for CTS teachers and students that provides (1) professional learning opportunities for certified teachers to improve upon their practical skills and theoretical knowledge in carpentry and welding, and (2) a separate and standardized student assessment tool of the theoretical component of the 3400 1st period apprenticeship program in carpentry and welding using The Learning Manager (TLM) online platform. This study focuses upon use of TLM as a standardized assessment tool.

This program was originally field-tested by RDC in 2007 in carpentry and welding at a small number of rural high schools in the Red Deer area to sample five Individual Learning Modules[1] (ILMs) which make-up a component of the overall trade area. Teachers observed at that time that the program was good, but the developed ILMs were too limiting for their students. This pilot expanded the number of ILMs, schools, teachers and students.

System Improvement Group, Accountability and Reporting Division, Alberta Education through work on the *CTS Student Assessment Framework Project* as part of the larger *CTS Initiative* has collaborated with RDC to pilot TLM in four high schools and one outreach school. This pilot was offered to determine the relevance, benefits and challenges of high school student online standardized assessment using a carpentry and welding apprenticeship model.

This pilot began partly in response to observations made by trade instructors at the Southern Alberta Institute of Technology (SAIT) in focus groups held in September 2008 who stated:

> *"High school students coming from some schools in the province who have apparently earned high marks in CTS modules do not have higher level skills or knowledge comparable to students from other high schools who apparently earned lower marks. It is evident that the grading of high school CTS modules by a number of teachers leaves a lot to be desired and they are significantly inflating their students' marks which hurts those students when they get to our programs and it becomes evident that they are not competent to the degree that their high school CTS grades indicate that they should be."*

The above observation provided by SAIT instructors is supported by high school CTS instructors gathered through individual discussions as part of this pilot project. These observations will be further discussed later in this document.

As indicated, this pilot is a component of the larger *CTS Initiative* that is being managed by Curriculum Branch in Program Development and Standards Division, Alberta Education.

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[1] Individual Learning Modules (ILMs) are hardcopy booklet resources produced by Apprenticeship and Training (AIT), Alberta Advanced Education and Technology for each individual apprenticeship training module. This is further explained in the *Individual Learning Module (ILMs) Hardcopy Resources* section of this study on P. 12.

CTS Student Online Assessment Pilot Project Study Description

Through collaboration between the Regional Trades Initiative at RDC, Program Development and Standards Division and Accountability and Reporting Division entered into a charter agreement to examine TLM and specific measures of the *CTS Student Assessment Framework*. The specific areas that this online student assessment pilot was to examine included:

1. Determining the impact of standardized student assessment upon opportunities for student success which potentially narrows the gap between schools of subjective teacher-awarded marks.
2. Determining the value of this online assessment tool for potential use by non-journeyman CTS teachers.
3. Assessing the impact of this online assessment tool upon student achievement.
4. Assessing the impact upon student and teacher perception of the online tool.
5. Determining the potential for future expansion of this tool beyond the initial pilot schools.
6. Determining the value of a specific student achievement measure in the Student Assessment Framework.

In order to better understand the opportunities and challenges of a program such as TLM and the possible impact upon student achievement, the following data sources were accessed and activities undertaken in the preparation of this study document:

- Discussions with representatives from the Regional Trades Initiative, RDC
- Focus group with instructors at SAIT
- Participation in TLM professional learning sessions with CTS teachers
- Interviews with pilot school administrators and CTS teachers
- Informal discussions with CTS students
- Survey results from eight school authorities' central office representatives
- Survey results from pilot school CTS teachers and students
- Student course marks
- Pilot school course completions in carpentry and welding
- Examination of existing TLM programs in secondary and post-secondary environments

A small number of primarily rural high schools and their CTS teachers participated in this pilot study. The schools and school authorities that participated included:

- Strathmore High School, Golden Hills Regional Division
- Trochu Valley School, Golden Hills Regional Division
    - Trochu Valley Outreach – which serves three area high schools
- Ecole Secondaire Lacombe Composite High School, Wolf Creek Regional Division
- Ponoka Composite High School, Wolf Creek Regional Division

CTS teachers from four schools were approached by representatives from the Regional Trades Initiative regarding their possible participation in this pilot study based upon their physical location within central Alberta or their previous collaboration with RDC. The outreach school joined in the pilot through their work with students at Trochu Valley School.

The participating CTS teachers included four educators who are certificated as journeyman in either welding or carpentry and an additional three teachers who were not certificated as journeyman. The non-journeyman teachers included:

- One CTS teacher in a specialized welding lab in an small urban setting
- One CTS teacher in a general course delivery lab in a small rural setting
- One Outreach teacher/administrator with limited CTS experience in a small rural setting

Study Limitations

The major limitation to the collected data is the small number of participants at the five schools. This pilot was small in scope and as a result, there were only five participating schools with seven participating CTS teachers and approximately thirty-seven (37) students involved. A small number of additional schools were invited to participate though they were unable to accept the offer due to: not having students who were eligible to register for 3400 level courses, not having CTS courses in carpentry or welding scheduled for the pilot time frame in semester 2, or the CTS teachers and school administrators felt that they did not have the time to prepare for a pilot initiative.

This creates a situation in which a few people are unavoidably able to increase the value of their responses. The number of participating schools and consequently of participating students, was low for the following reasons:

- The timeframe with which this pilot developed from proposal to implementation was short
- Departmental budget considerations
- Limited personnel and information technology (IT) resources at RDC within the budget constraints of this pilot
- RDC's operational mandate to stay within the boundaries of Central Alberta
- Pilot intentional design to include small rural schools
- The small number of high school students who were eligible to register for the 3400 1st period apprenticeship courses when this pilot developed

The online survey provided to participating teachers and students received a small number of responses: five teachers and three students. Five of seven possible teacher responses are strong in comparison to the overall number of participating teachers, though the overall number is low. This was a known factor upon the initiation of this study. As a result of this small *n*, the survey results are not provided in this document nor were they used to directly impact the findings of this research. Survey results were used to provide discussion topics for the formal and informal contacts made with teachers, school administrators and students.

Some students were enrolled in the pilot by their participating teacher after the start of semester 2 and did not necessarily have the same amount of instructional time as other students. This is evident for carpentry which was included in the pilot at 'the last moment' in order to expand the TLM opportunities and assist in determining the capabilities of TLM in a different trade area. As a result of this expansion, carpentry students and their teachers were exposed to TLM though they were not able to explore the program as deeply as those students in welding.

The participation in this study of three non-journeyman CTS teachers is not viewed as a limitation. The hypothesis proposed holds that all CTS teachers may benefit from use of the TLM program since TLM as a tool provides resources and standardized student assessment, resources that CTS teachers may not normally have access to, nor expertise in. A significant number of CTS teachers in Alberta do not possess journeyman credentials and this is identified in the *Non-Journeyman CTS Teachers* section of this study.

The 3400 level courses currently resourced by TLM are to be provided through the instruction of journeyman certificated instructors/teachers, whereas the introductory, intermediate and advanced CTS courses (non-3400) do not require journeyman instructors. The potential exists to expand TLM to other CTS courses.

Pilot students using TLM are in two categories, those completing welding and those in carpentry. The number of carpentry courses completed at the 3400 level was very low in relation to the number of students who were both interested in the program and for whom pilot teachers felt were capable of attempting 3400 level courses successfully.

There were several reasons for the low number of credits earned in carpentry as displayed in chart form on the following page:

1. Originally only welding was to be part of the pilot. Carpentry was incorporated 'at the last minute' due to interest expressed by some of the pilot schools that offered both carpentry and welding and the opportunity that the pilot presented for a 'test vehicle' for carpentry.
2. The RDC carpentry department rushed to align first year apprenticeship to 3400 level courses on the TLM system and this resulted in some delays for start-up.
3. Many of the carpentry students were taking full course loads, so this pilot became overwhelming for some of the students.
4. The delay in introducing the pilot after semester 2 had already started may have overwhelmed students who already had a full course load. Their initial enthusiasm for TLM may have been tempered as they became increasingly aware of the program work requirements.
5. One of the two carpentry teachers in this pilot was actively involved in Skills Canada competitions at the provincial and national levels and this was the focus of his efforts. As a result, the pilot may have not received the emphasis required at that particular site.
6. One carpentry teacher was not familiar with digital technology and was not comfortable with online applications. RDC personnel spent additional time working with this individual.
7. This pilot was an 'add-on' to the regular CTS programming. The two pilot schools that offered carpentry did not have an opportunity to adequately timetable the instructional hours necessary for students in addition to their regular timetable programming for other CTS courses.

The challenges experienced in carpentry were not evident in welding. Welding students were able to progress at a faster pace that permitted more students to earn credits and to more thoroughly test the TLM assessment program.

Charts 1 and 2 indicate the number of credits earned by each student participating in the pilot. It is interesting to note that the fourteen welding students were divided amongst five pilot teachers

and the twenty-three carpentry students were registered by only two pilot teachers. This may be an indication that the carpentry teachers and their students were overly enthusiastic about the TLM opportunity and did not fully anticipate the challenges of participating in this opportunity.

Chart 1: TLM Earned Carpentry Credits

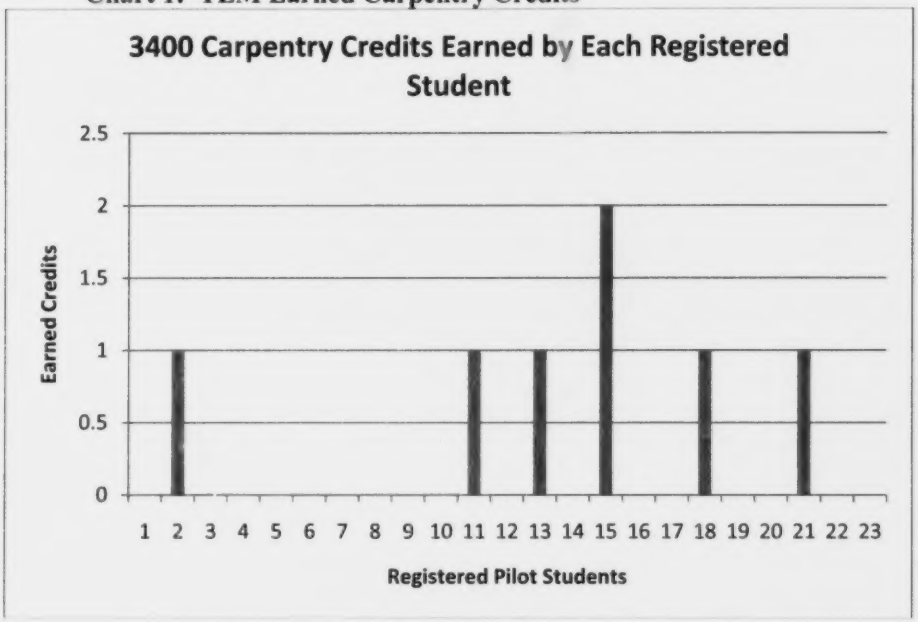
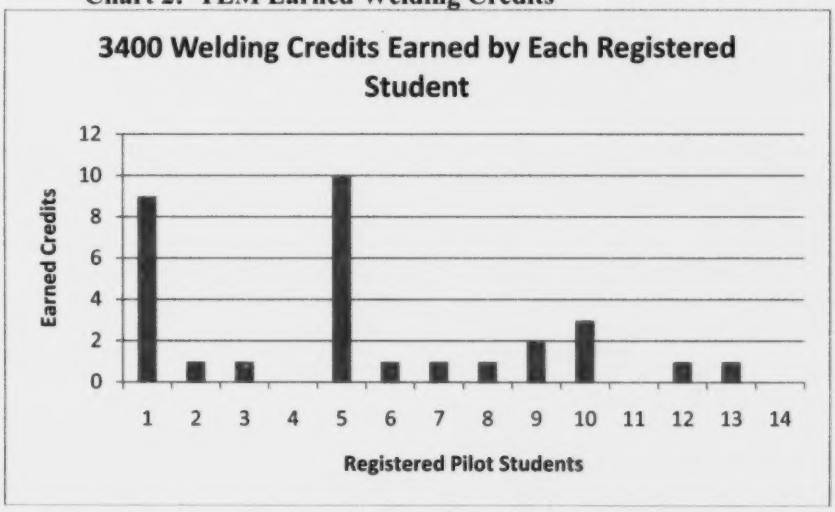

3400 Carpentry Credits Earned by Each Registered Student
Earned Credits
2.5
2
1.5
1
0.5
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Registered Pilot Students

Chart 2: TLM Earned Welding Credits



The lack of credits earned in carpentry by the number of students participating may be a further indication of the challenges evident with the required learning to the 1st period apprenticeship level in the 3400 courses.

Non-Journeyman CTS Teachers

It is generally accepted, though the exact numbers for the province are not known by Alberta Education, that the majority of CTS teachers in Alberta do not have journeyman status in any trade area. This belief is supported by data from a survey of superintendents conducted by the System Improvement Group in collaboration with Workforce Planning Branch, People Resources Division, in November 2008 in eight school authorities in Alberta that ranged from a small rural board of approximately 1500 students to a large urban board of 30,000 students. Results of this survey completed by superintendents or their delegated representatives indicate that of the total 226 teachers who were identified as teaching CTS in those school authorities, only 51 or 22.6% of them were known by central office personnel to be certified journeyman in a trade area. An additional 45 teachers or 19.9% had additional non-journeyman credentials in other trade areas; of this number some credentials were in curricular areas in which earning journeyman status is not possible (i.e. business administration, agriculture, transportation and health care).

The survey of superintendents indicated that all eight school authorities have experienced significant challenges in recruiting CTS teachers certificated to the journeyman level and they anticipate that this challenge will increase even further in the coming years.

Non-journeyman teachers are not currently able to instruct students at any level of journeyman without the full-time supervision of a journeyman instructor, if those students wish to then challenge the 1st period apprenticeship exams. The situation requires schools and school authorities to develop partnerships with post-secondary institutions that may be able to supply journeyman instructors who will assist non-journeyman CTS teachers or perhaps other partnerships with companies or individuals in local communities who have journeyman status and are willing to assist the schools under the supervision of certificated teachers who are not journeyman. This situation was explored in this pilot as RDC provided a journeyman welding instructor to assist a non-journeyman CTS teacher at one high school on a part-time basis.

TLM as Offered by Red Deer College

The TLM model developed by RDC offers some specific features for the five schools involved in this pilot:

- Online review testing for each unit (screen shot provided in *Appendix C)*
    - All online testing is assessed immediately and the results are provided to the student and teacher
    - The passing grade for testing is set at the industry apprentice standard of 70% though this may be revised by each individual teacher
    - For each question that is incorrectly answered, the student is provided the specific location in the Individual Learning Module (ILM) in which the outcome is located, allowing the student to review that concept prior to retaking the review test
    - Students that are required to re-take a quiz/test if they do not receive a score of 70% receive a number of new questions (approximately 20%) that they had not previously been tested on, covering specific outcomes of that particular testing module
        - Some assessments are up to 60 questions in length
        - Each quiz or test accessed by students is unique (i.e. two students taking the same test at the same time will have different questions)

        - All questions have been validated by RDC
    - RDC has created an exam bank of approximately 1800 questions for welding at the 3400 level
- A larger practice online test taken prior to the final exam
- A final online exam for each course that must be supervised by a teacher at a designated writing location (i.e. participating school)
- Online resources as uploaded by participating teachers or by RDC into the central resource repository (i.e. videos, exemplars, rubrics, assignments, etc.) to provide a library of appropriate resources
    - Project descriptions can be adapted and placed online
    - Rubrics for common projects and other assessments
    - Pictures of specific welds or other trade skills
    - Videos of weld techniques or other trade skills
- TLM is primarily designed to be an assessment tool, though as explained above, it does possess features that would permit teacher and student access to specific, appropriate and approved resources uploaded by a central body.

As previously indicated TLM in this pilot is formatted to the new 3400 1st period apprenticeship carpentry and welding courses that are scheduled to be implemented in September 2009. This pilot used the current CTS courses that are either aligned or supported by the 3400 level courses and these courses are identified in *Appendix B* of this document. This pilot is examining the TLM model for online assessment and is not assessing the 3400 level courses.

Individual Learning Module (ILMs) Hardcopy Resources

ILMs are booklets that are updated and supplied annually by Apprenticeship, Industry and Training (AIT), Alberta Advanced Education and Technology and are written and produced for each individual module and revised yearly to current industry standards with new materials and trade practices that impact that specific area. ILM users, including students and teachers, are able to submit any suggestions or concerns to AIT when the booklets are revised each year, again ensuring that they are current and relevant.

This pilot program that involves RDC and Alberta Education offers self-study courses online that were written by trade content experts and include illustrated learning modules, ILMs, that are supported by hardcopy resources provided to each student. In 2006, RDC through Alberta Education conducted an in-depth review of some of these resources and others were researched and written and continue to be developed by other industry groups through direction and collaboration with AIT.

TLM offers students and their CTS pilot teachers tools for development, delivery, reporting and management of training and learning materials. It uses a central object repository to facilitate the creation, storage and reuse of learning content that, in the case of RDC and this pilot, are carpentry and welding to 1st period apprenticeship. Students are able to access this program through any computer that has internet access. Students participating in this pilot were each supplied with the appropriate ILMs.

TLM Technology

This pilot operated using a current server at RDC. However, concerns were expressed at the start of the pilot related to the abilities of the server to handle the additional requirements of the connection to the five school sites, the approximate thirty-four students and seven teachers. Over the course of the pilot only one technological 'glitch' developed related to TLM and that was an interruption in the external server that was quickly and effectively corrected.

This pilot has proven that the external server was capable of handling the small number of additional users and indicated that the RDC system was well-developed. It is anticipated that if a greater number of users were to access TLM through RDC that a new server would need to be purchased as had been discussed during the negotiations of this pilot between RDC and Alberta Education. The cost of an appropriate server was determined to be approximately $27,000 in late 2008 by RDC staff.

Pilot teachers indicated that they felt comfortable using TLM and that they were quickly able to navigate through the online features and understand the uses and opportunities.

Any user questions that developed in the early stages of the pilot were effectively dealt with through a telephone contact with the RDC contact technician responsible for troubleshooting TLM. Teachers indicated that their questions met with an immediate and effective response and that their students did not experience any technology concerns.

Initial teacher training on the use of TLM consisted of one in-service session lasting approximately four hours at RDC in a computer lab and a significant amount of this time was spent by the teachers 'playing' on the program to see TLM features and options.

TLM Site Fees

There was a site fee charged by RDC of $4,000 per school to permit access to the RDC developed TLM resource. This fee was a reduction from the usual amount charged by RDC to Alberta post-secondary institutions for access to the TLM courses that they have developed.

The site fees and other pilot costs were covered by Alberta Education through a conditional grant to Red Deer College.

Alberta Journeyman Certification Explanation

Journeyman Certificate programs combine both on-the-job training and post-secondary study to prepare graduates to work as tradespersons in Alberta. Successful completion of apprenticeship training leads to a Journeyman Certificate. There are up to five levels of training, also called 'periods', that must be taken prior to gaining eligibility to be certified as a journeyman that depend upon the trade area and the level of certification desired. To better explain the concept it needs to be understood that apprenticeship is the process of training and journeyman is the certificate earned.

To move from one level or period of apprenticeship to the next a student must[2]:

- Have the required number of months of on-the-job training
- Have the required number of hours of on-the-job training
- Successfully complete technical training
- Pass industry exams through AIT
- Ensure their individual Record Book is updated by their employer
- Send their Record Book to AIT for a Certificate of Progress stamp

TLM uses student online assessments to assist high school students meet the 1st period apprenticeship technical requirements as managed by AIT. Once certified as a journeyman, many trades offer graduates the opportunity to earn a Red Seal, which is recognized in other provinces and territories that participate in the Red Seal program, allowing the journeyman interprovincial options for employment.

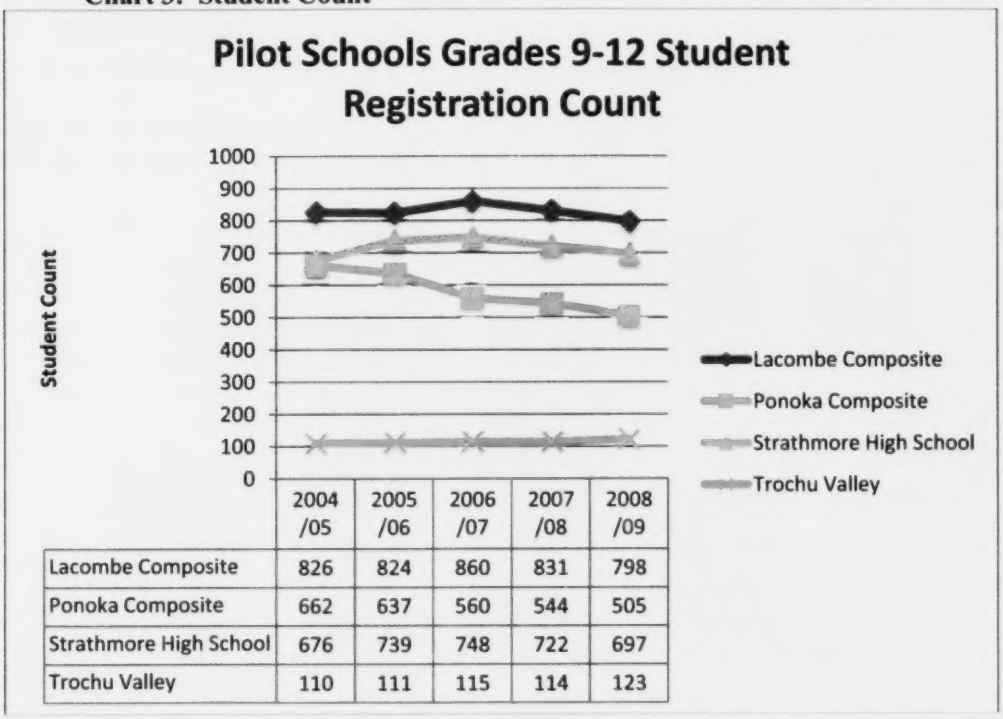
Pilot Schools Background

The five pilot schools involved are from either small urban or small rural settings and are themselves from smaller school authorities. The subsequent programs that are offered at each school are delivered through specialized labs for carpentry or welding that are (1) designed and equipped to the journeyman level as determined by the standards developed by AIT, or (2) are physically smaller general labs that are not designed nor equipped to the journeyman level.

The type of CTS lab in a school is somewhat dependent upon the overall student registration count of the school and subsequently the population of the community in which it is situated. The student registration counts at each pilot school are provided in Chart 3 to simply indicate the general population of each of the regular program high schools involved in the pilot.

[2] Advanced Education and Technology, Post-Secondary Education System. Website http://aet.alberta.ca/post-secondary/credentials/definitions.aspx

Chart 3: Student Count



	2004 /05	2005 /06	2006 /07	2007 /08	2008 /09
Lacombe Composite	826	824	860	831	798
Ponoka Composite	662	637	560	544	505
Strathmore High School	676	739	748	722	697
Trochu Valley	110	111	115	114	123

The relative student population of each pilot school is a general indication of the number of potential students in CTS and specifically in a specialized program such as carpentry or welding as examined in this pilot. It may be possible to assume that the larger the general population of the school, the more potential students may be registered in CTS and therefore a larger number are potentially eligible for a higher level specialized 1st period apprenticeship program. There is always the opportunity for an engaging CTS teacher in a small school program to have a larger percentage of students registered in CTS courses, depending upon the program that they are able to offer.

Charts 4 and 5 offer an indication of the average number of credits earned by each student in the four pilot schools who enrolled in welding or carpentry.

Chart 4: Carpentry Credit Average

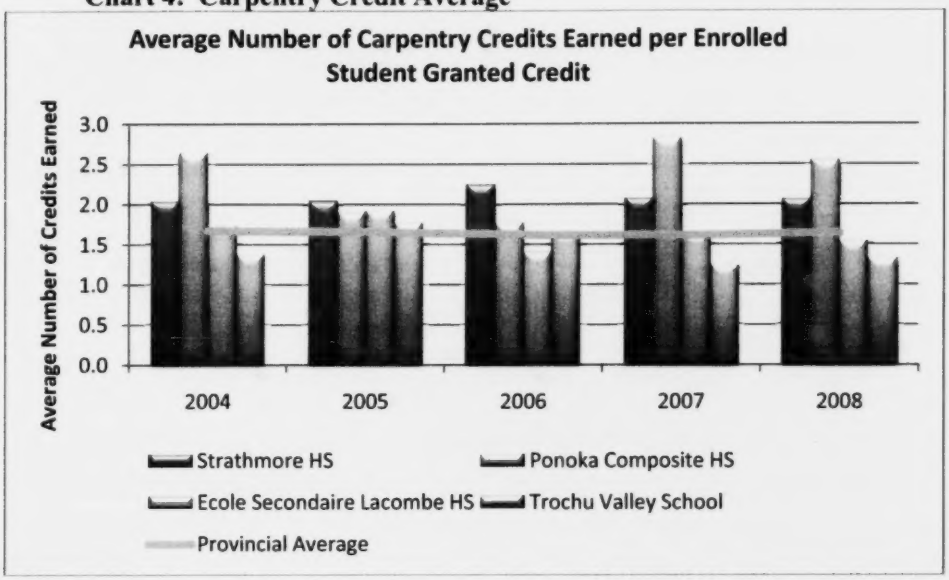
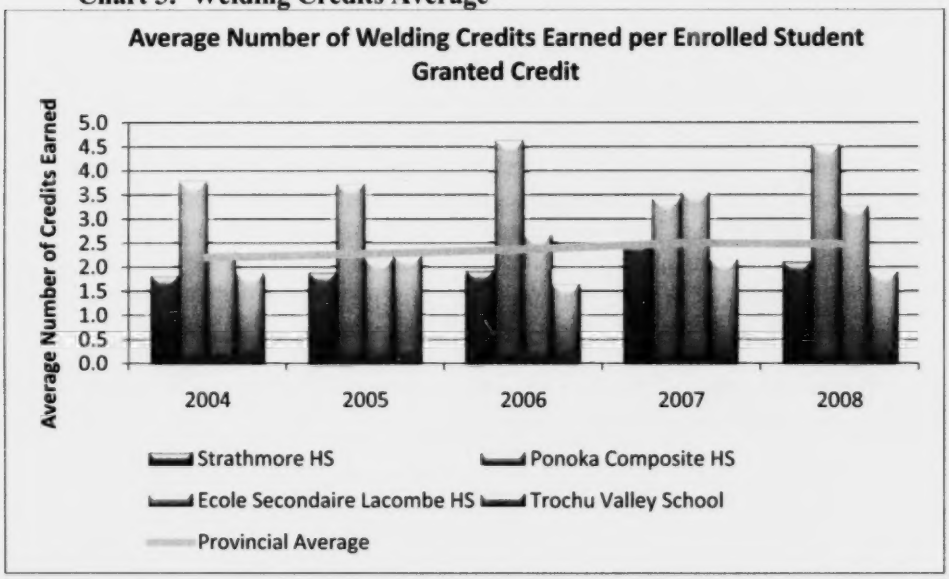


Chart 5: Welding Credits Average



The average number of earned credits in carpentry and welding is below the threshold of five credits per student, which is the usual target that high schools attempt to schedule each student to earn for budgetary reasons. The lower number of earned credits in carpentry and welding in the pilot schools and as a provincial average may be due to a couple of reasons:

- Some CTS modules may take longer to complete than others and create a 'time crunch' in the allotted student timetable

- Students may be registering in modules from different CTS strands not solely from welding or carpentry within the course of a semestered CTS course block and this is not reflected in the chart data

Further evidence of this is provided in Chart 6 on the following page that identifies students are taking a variety of strands in CTS and earning more credits than Charts 4 and 5 would indicate.

Chart 6: Average CTS Credits

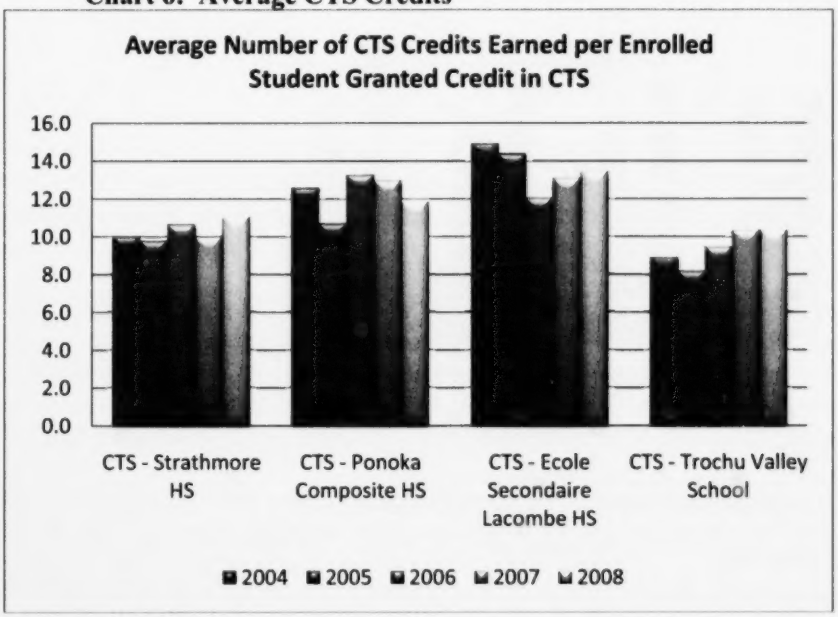
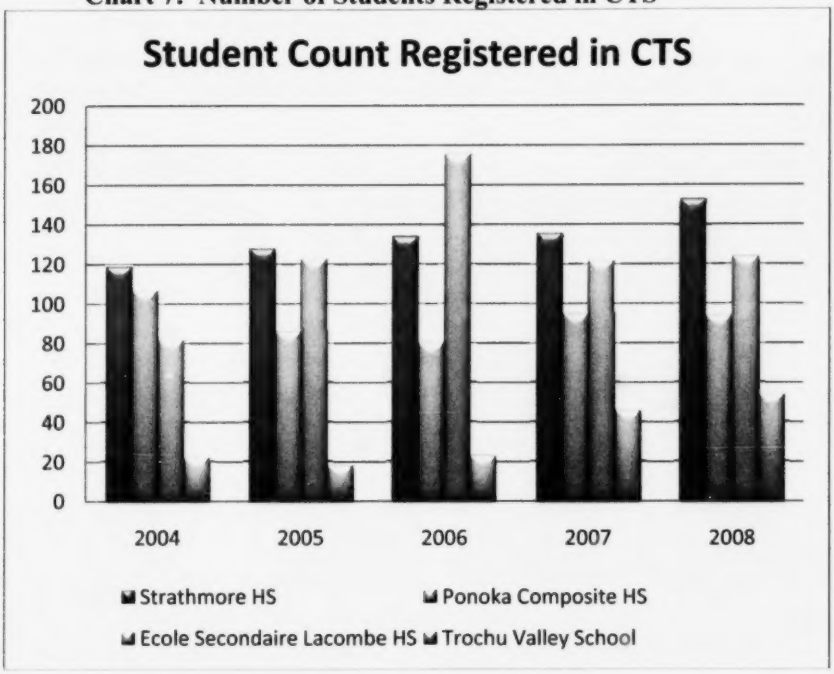


Chart 7 provides a count for the total number of students registered in CTS in the pilot schools.

Chart 7: Number of Students Registered in CTS



Pilot Study Question Response

Six questions presented earlier in this document were identified as the focus of this pilot and will be addressed in order. Information will be provided to indicate the success or challenges that were evident in the collection of data for each area and the possible conclusions determined (all teacher and student responses are provided in *Appendix D* of this study).

1. **Determine the impact of standardized student assessment upon opportunities for student success that potentially narrows the gap of subjective teacher-awarded marks.**

As the observation from SAIT instructors presented earlier in the *Background* section of this document stated, post-secondary instructors have been concerned about the number of students that they see in their courses who have skills below what their high school CTS marks would suggest. This assertion was further strengthened by an observation offered by a CTS teacher participating in this pilot. It was reported by an administrator at this CTS teacher's school that a number of students from other schools neighboring the community were transferring into this school for the senior year in order to access additional course offerings in the academic core subjects as well as CTS. The CTS marks in credits previously earned by the transferring students suggested that the students had a level of competence and success that was relatively 'significant' as indicated by their awarded transcript marks at 85% and higher.

The receiving CTS teacher in carpentry, who had a journeyman certificate, provided this observation:

"Their (the student's) previous 90% is the equivalent of a 45% in my program...they just do not have the skills that they are supposed to if they had finished the modules that their previous school said that they did."

One high school student who is registered at a pilot school after having transferred from an out-of-district high school indicated that in relation to the course marks previously received in CTS carpentry:

"I don't know how I got the (high) marks that I did at my last school...I really didn't do anything in class."

TLM offers industry-standard questions and resources that teachers previously did not have access to. The standardized online assessment permits students to complete exams and receive instant marks in the theoretical components. Students must complete practical applications of their skills that are graded by the classroom teacher. In the determination of the final overall course grade for a course, the classroom teacher determines the weighting of the theoretical and practical components to determine an overall course grade.

TLM as constructed by RDC offers the opportunity for exemplars and rubrics to be posted to allow each teacher and student access to industry standard resources for grading of practical assignments. It is also possible to develop projects and post them on TLM permitting teachers and students to have a variety of projects to choose from as an additional means to challenge both students and teachers.

Each CTS teacher and school administrator participating in this pilot specifically stated when asked, that online assessment would strengthen CTS by helping to ensure that students were accurately graded.

The principal of the participating outreach school indicated:

"Standardizing student assessment would be of a great value. As we are an alternative school, we get students from many different schools. Having standardized modules, tests, etc. would be of a great value. It would definitely level the playing field. On the other hand, sometimes our programs are seen as being easier for the student to achieve success. This would also do away with this view.

And concludes:

"Therefore, TLM acts as a level playing field for theory delivery. There is no question as to the student's performance level. There then is no question as to whether an outreach program has adjusted the required level of student performance - which is in question from schools who identify themselves as academic schools. We are then respected for adjusting only the learning strategies."

2. Determine the value of this online assessment tool for potential use by non-journeyman CTS teachers.

This question was posed to the participating pilot CTS teachers and their general responses indicate that the TLM program is:

- A strong resource for assessment and as a repository for current industry standard material
- A resource that cannot be purchased from any commercial sources (i.e. publishers) that create material for other subject areas such as Math or Science
- Provides opportunities to challenge students and their teachers
    - Encourages non-journeyman teachers to learn new skills and stay ahead of their students through appropriate professional learning opportunities that may then be reflected through improved assessment strategies

It is noted that this resource is intended to assist teachers in the recognition that non-journeyman CTS teachers may not have the benefit of the practical experience and theoretical knowledge that journeyman may possess. TLM offers assistance for the theoretical knowledge and may provide visual resources that are downloaded into the program central repository. These resources would provide practical guides for students and teachers such as: exemplars, rubrics, videos, common projects, industry web resources and teacher developed resources.

As stated earlier in this document, non-journeyman CTS teachers are not permitted by AIT to teach the 1st period apprenticeship program without the support of a journeyman instructor and have their students then positioned to challenge the 1st period exams. This supporting arrangement is left to the individual school or school authority to determine through a partnership with an outside organization or the hiring of a journeyman who would then instruct under the supervision of a school or school authority certificated staff member.

One possible concern raised with the use of non-journeyman teachers providing instruction to the 1st period apprenticeship level, even with the support of a journeyman instructor, is that non-journeyman may not have the practical experience in their field that is considered to be a strong and vital benefit by many in the field when instructing students in welding or carpentry and other trades. They need to be able to 'stay ahead' of student theoretical learning, however they are unable to provide instruction from an advanced practical background. This is an indication that a school or school authority partnership with a journeyman in a supporting instructional role is central to the overall student and program success.

To maintain the standards and rigor of the new revisions to the CTS program, a journeyman is required to provide instruction to those students who are preparing for 1st period apprenticeship. The standards and rigor are the same as those offered in post-secondary institutions. Anything less would diminish the intent of the CTS apprenticeship program. Those students who do not intend to enter into an apprenticeship but would like to take these courses may do so and receive instruction from an instructor without journeyman status. Those schools and school authorities that would like to offer the apprenticeship program and do not have a journeyman may enter into an agreement with a journeyman to teach the entire program under the supervision of a classroom teacher.

The potential exists to expand TLM to other CTS areas that are not at the 3400 level, though it is recognized that this would be a labor intensive process. Participating pilot teachers indicate that the use of TLM would have a significant and positive impact upon addressing the concerns evident with the teacher-awarded mark gap, as was observed in the previous *Question 1*

response. The vast majority of credits earned by students in CTS are at the introductory, intermediate and advanced level that are not equivalent to the new 3400 level.

3. Assess the impact of this online assessment tool upon student achievement.

The scope of this pilot did not permit a thorough examination of the nature of the work required to adequately address how TLM, as an online standardized assessment tool, may impact student achievement in CTS. The small number of schools, teachers and students and the fact that this pilot was only conducted over the course of one semester are the contributing factors to the inability to fully examine this concept. However, there were a number of anecdotal comments provided by participating teachers that offered their perception of TLM that may assist by providing a limited view.

Teachers participating in the pilot indicated their belief that TLM would challenge students to accomplish more in the theoretical area of carpentry and welding. The exposure to industry standard resources was indicated to be a significant "carrot" for many students and that many appreciated the connection to "real-world scenarios".

It was observed by pilot participants that the TLM program may be beneficial to other educational programs such as the Registered Apprenticeship Program (RAP) and to Work Experience placements. The opportunity to place students with appropriate businesses may improve in some situations.

> *"I see that TLMs can help RAP/work experience coordinators relate to people in our work placements. There is the TLM theory which can assist the students to understand well enough to ask question of their employer/journeymen. It also outlines the scope of expectations that are needed. For small, rural communities—with serious thought and development, the linkage between RAP and TLMs may improve a partnership between those who need to run their business and the school who wants students to have a more rounded perspective that the business is prepared to offer. After all, businesses are run for the purpose of making a living and not for educating our students."*

In the experience of the outreach program, student participation in TLM was used as the incentive to complete other curricular requirements for a "bright" student who was not challenged by "regular" courses. This particular student did successfully complete the other requirements and progressed in TLM.

It was agreed upon by the participating teachers that the students who have the opportunity to participate in a program such as this will achieve to a higher standard than in a regular CTS program. The emphasis upon industry standards with a minimum mark of 70% and the specific AIT requirements for completion of the multiple 1st period apprenticeship journeyman components assists to ensure this.

It was stated by a participating teacher and echoed in separate responses by other participants that:

> *"If we set the bar at a high level for the students and show them what the real-world expects, they will rise to that level. I have seen it already with my students and we have*

younger students who can't wait to get involved with this and show what they are capable of achieving."

As previously indicated in this document, one student completed all of the theoretical components of the 1st period apprenticeship program and requested the opportunity to challenge the AIT 1st period apprenticeship Journeyman Exam in welding. A second student was working to complete the last module and would also be in position to challenge the AIT exam.

A stumbling block in the process was concern expressed by AIT that the student's high school CTS teacher was not certified as a journeyman. This CTS teacher was supported by a certified journeyman welder from RDC to assist in facilitating this pilot on a part-time basis. AIT's position was that complete instruction needed to be provided by a certified instructor.

The fact that a student was able to complete the requirements and be placed in a position to write the AIT exam is significant. Discussions between RDC and AIT may permit the student in question to write the exam through the approval of AIT, if RDC signs-off on all the required skills that the student in question needs to demonstrate. RDC has since completed the sign-off.

4. Assessing the impact upon student and teacher perception of the online tool.

Teachers and students were impressed with the robust nature of the program. Teachers, whether they were journeyman or non-journeyman, agreed that TLM challenged both them and their students in a positive manner in which they previously had not experienced.

Their joint observations regarding TLM and online student assessment include:

- The ability to access current industry-standard material from one site that is pre-made has not been possible before this
- The ease of the online program operation was noted as a definite strength
- This online program has the potential to expand and address issues and concerns with the delivery and marking of other CTS courses that are at the non-3400 level and at the introductory, intermediate and advanced levels as well
- Teachers feel that the exposure to this advanced technical learning and the standardized assessment has caused other teachers to revise their previous perception of CTS. One participating teacher relayed a colleague's comment, *"If it has a standardized test like a diploma, then it must be an important class."*
- *"The difficulty level gives credibility to the vocation and makes students realize just how much an apprentice welder is expected to know."*
- Students stated their belief that a standardized and supervised exam, such as those found at the conclusion of each course, increased the "value" and the overall "status" of CTS increased, *"This is not easy stuff. You have to study and know it or you will not pass. The online tests are tough and it is an exam that means a lot."*
- Student inquiries into the possibility of continuing to access TLM and further their training over the summer months outside of the regular school calendar year
- The opportunity for TLM to serve as a central repository for resources that teachers and students can access provides a 'level playing field' that assists to ensure that the latest industry-standard material is available.

- This feature needs to be explored more and would greatly assist both journeyman instructors who may have some background materials and the non-journeyman instructors who have to 'scramble' to collect resources that are current.

Administrators indicated that TLM provides the opportunity to improve the status of CTS due to standardizing assessments and the necessity for students to be better prepared to meet the course requirements. It was indicated that this program will also require some students, teachers, school counselors, parents and school administrators to re-think their view of CTS with the realization that, *"This program is tough and not an easy credit. Students have to work and know their stuff...for some it will be a rude awakening."*

5. Determining the potential for future expansion of this tool beyond the initial pilot schools.

Participating pilot teachers indicated their belief that TLM displayed strong characteristics that would make it a desirable resource to make available to all high schools in Alberta.

There were a number of positive factors that they identified to support their assertions:

- TLM presents a significant opportunity to encourage non-journeyman and journeyman CTS teachers to improve upon their skills
- The use of current and relevant industry-based information is a resource that is not available from any other source
- There is a significant opportunity to expand TLM beyond carpentry and welding to all other CTS courses that have journeyman credentialing
- The opportunity to use TLM in welding at the 1st period apprenticeship was the incentive to continue in high school for one student (an observation shared by an RDC instructor)
- Younger high school students are enthused about the opportunity to use TLM once they enter Grade 11 and have completed the required introductory and intermediate course work
- The "real-world" learning for students was significant and 'invaluable'
- A belief that TLM could be beneficial to all areas of CTS at the introductory, intermediate and advanced levels, not just for certain 3400 level courses
- Opportunity to address the school-awarded mark gap that has been experienced by CTS teachers in the pilot schools
- If there was a TLM type system, which included the theoretical material, available to all CTS teachers in the province, this would improve the instruction and assessment of the modules
- One student in carpentry has requested that he be able to access TLM over the summer to permit him to complete additional courses
- Opportunity for creative partnerships between schools, school authorities, businesses and post-secondary institutions through TLM would improve relationships and community awareness for school programming
- The effort that Red Deer College personnel have put into making TLM an effective online tool for carpentry and welding that is supported by strong professional learning opportunities through their summer program is a model that other institutions should learn from

- The collaboration and support that Red Deer College has initiated and developed with schools and school authorities needs to be replicated in other areas of the province with other post-secondary institutions and school authorities

The positive factors stated by the participating teachers also included a number of caveats regarding the potential to expand this resource availability:

- Schools using TLM need to have their lab equipped to the level required to teach to the journeyman level or access is needed to a facility that is at the required level
- Schools need to have computer access in the CTS labs for student and teacher interaction when using TLM
- Non-journeyman CTS teachers may face a significant challenge to 'stay ahead' of the learning of their students as they do not have the practical experience of journeyman
- The costs associated with TLM site fees and offering 1st period apprenticeship programming at the high school level may be cost-prohibitive for small schools or school authorities
- Strong and practical professional learning opportunities need to be made available for CTS teachers similar to the offerings available at Red Deer College in the summer program to better equip teachers to 1st period apprenticeship status
- Schools and school authorities examining the potential to create partnerships with outside organizations or post-secondary institutions to share journeyman instructors may face significant challenges in small, rural communities due to the lack of availability of appropriate and qualified journeyman willing and able to share their expertise
- Strong connections between the schools and post-secondary institutions (Red Deer College in this instance) need to be built and maintained to ensure that teachers are effectively using TLM
- Connections need to be built between schools within school authorities and neighbouring school authorities in order to more efficiently access programs, facilities, resources and personnel

Expansion of this online standardized student assessment resource to other high schools in Alberta that will be providing the 3400 level courses particularly in carpentry and welding and opportunities for schools and school authorities to maintain current CTS programs or expand upon them needs to consider a number of factors:

- The ability of Red Deer College to expand the number of schools and students that access the program that they have developed given the constraints of:
  - The college personnel and their time and other professional responsibilities
  - The college budget
  - The college mandate to serve Central Alberta
- The opportunity for Alberta Education to undertake a leadership role in the assessment of CTS within the constraints of:
  - The Ministry vision to develop a role in CTS standardized assessment
  - Ministry personnel considerations
  - Ministry budget considerations
- The desire for school authorities and schools outside of the current pilot to embrace an area of standardized student assessment that has not previously been explored (i.e. CTS)

- The desire of schools and school authorities to discuss partnerships or sharing arrangements with other schools, school authorities and post-secondary institutions
- The desire of schools and school authorities to maintain current CTS programs or expand them to better meet the needs of students and the community

6. Determining the value of specific student achievement measures in the Student Assessment Framework.

As part of the *CTS Initiative,* the System Improvement Group has been tasked with developing a CTS *Student Assessment Framework* that is intended to accomplish two tasks: (1) measure the impact of the delivery and implementation of the revised program and (2) summative measurement of student achievement in CTS. The framework would assist in meeting challenges presented by the information gap in a critical subject area for high school students and better position educators to address the needs of individual students in CTS. The current draft of this framework is provided in *Appendix E* of this document and it should be noted that the framework is part of a larger document, *Career and Technical Studies (CTS) Student Assessment Framework: Focus Upon Two Tasks, Draft Document 12.1* posted on the CTS Education Base website internal to Alberta Education and that this document is currently undergoing revision.

In CTS there are several key questions regarding the development and use of student assessment measures that are not currently asked of schools and school authorities in the development of education plans, yet are critical and are directing the efforts of many stakeholders:

- What is the minimum that we want students to have?
- What should students in CTS know, be able to do, and value?
- Have the graduates who have participated in CTS acquired the intended learning?
- What are the contributions of the school and the CTS program to student growth?
- How can student learning be improved?
- What should students be learning and in what ways should they be growing?
- What are students actually learning and in what ways are they actually growing?
- What should we be doing to facilitate student learning and growth?
- How should we measure student learning and growth?

The construct of a student assessment framework for CTS will assist educators to better meet the needs of individual students by providing data to educators, allowing program delivery revisions to be made at the classroom, school authority and provincial levels in a timely manner.

The student assessment framework in CTS is an opportunity to build upon the successes that are presented with the considerable work done by all stakeholders in revising the high school CTS program. The timely collection of data will benefit schools, school authorities, post-secondary, industry, the province and ultimately the students.

The framework was developed initially through focus groups held with the diverse membership that comprises the Career and Technology Studies Advisory Committee and was then reviewed through presentations and feedback received from a number of stakeholder groups. These stakeholder groups included:

- Career and Technology Studies Advisory Committee
- Innovative Learning Services Unit (ILS), Calgary Board of Education (CBE)
- CTS teachers from the CBE and Calgary Catholic through ILS
- University of Calgary, Faculty of Education Professor
- College of Alberta School Superintendents (CASS) Executive
- Southern Alberta Institute of Technology Department Heads and Technical Instructors
- Red Deer College, Regional Trades Initiative
- CTS Project Management Team (internal to Alberta Education)

There are currently twenty-nine measures proposed to analyze the impact of the delivery and implementation of the Revised CTS Program and thirteen measures for the assessment of student achievement. This pilot conducted with RDC examined one of the measures of student achievement:

The number of students who access an online test provided by the Regional Trades Initiative in carpentry or welding following the completion of a grouping of courses

TLM allows the opportunity to assess student abilities in a specific area and provide an indication of how the introductory, intermediate and advanced CTS courses are preparing students to take the 3400 level 1st period apprenticeship program.

This online program would assist in addressing the school-awarded mark gap identified as a concern by the instructors from SAIT and by pilot school CTS teachers.

Current Status of TLM at Red Deer College

Over the course of the last several months, additional interest in the use of TLM has been expressed by a variety of education stakeholders through their participation in this pilot or through professional learning opportunities that RDC has provided. The TLM opportunities include:

- RDC expanding TLM to include 1st period apprenticeship mechanics
- RDC using TLM to train high school teachers in welding, carpentry and mechanics
- Two principals in Golden Hills Regional Division are receiving their 1st period apprenticeship technical teacher training in welding instruction through TLM
    - Eight weeks of practical 1st period apprenticeship training is being condensed into six weeks of teacher training offered in one week courses each summer at RDC in welding, carpentry and mechanics
    - These courses are in the process of being recognized as transfer credits to the Faculty of Education at the University of Alberta
- One principal in St. Thomas Aquinas Regional School Division is receiving his 1st period apprenticeship welding instruction through TLM
- Hutterite colonies in Golden Hills Regional Division have expressed interest in accessing 3400 level welding course instruction for their students
- SunChild First Nations have expressed interest in welding instruction for their students
- Home education advocates are exploring this resource for welding instruction

One Math teacher in Lacombe, who observed the use of TLM in the CTS pilot at that participating school, has investigated the resource and has expressed an interest in building an application for Lacombe High School using the Math curriculum.

Some of the schools that have participated in the pilot have expressed an interest in continuing use of TLM in September 2009 regardless of the findings of the pilot study or financial support for the site fees from Alberta Education.

Conclusion

This was a pilot that centered on a limited number of schools, teachers, students and time and was not as in-depth a study as would have been preferred under ideal circumstances. Nonetheless, there are components of TLM that were explored and identified in this pilot as possessing the ability to significantly benefit students and teachers in CTS. The opportunity to standardize student assessment on the theoretical component of skills attainment and reduce the mark gap between programs, thereby providing a better indication of student abilities and a means to resource current industry-standard resources is a tool that would assist students, teachers, school authorities, employers and post-secondary institutions.

It appears that Red Deer College has spent considerable time and effort in developing TLM for the 3400 level courses and that the online tool has performed better than anticipated. At the start of this pilot, technical issues were anticipated however they did not materialize at all. Pilot teachers did not report any technical concerns other than one server issue two weeks into the pilot that was quickly and effectively handled. It should be noted that of the seven participating pilot teachers, not all would consider themselves to be 'technologically savvy' and two of them initially indicated that they could be referred to as 'technology illiterates'.

The four-hour professional learning opportunity provided by RDC at the start of the pilot and their follow-up contact with the pilot teachers worked to effectively answer any questions and provide the knowledge necessary to navigate the system. All teachers reported that after a short time using TLM that they felt comfortable and confident using it, though one teacher required additional support.

The opportunity that TLM provides to manage available resources as a central repository and to provide standardized student assessment is a significant resource that may assist the further development of CTS across the province, particularly in smaller centers that do not have access to specialized personnel or materials. With the continued challenge that many schools and school authorities face in attracting and retaining qualified and skilled CTS teachers, TLM would assist in two significant areas of classroom instruction, that of finding appropriate and current resources and in the creation of appropriate and standardized student assessments.

This pilot was viewed as a work 'add-on' by the participating schools and teachers offered TLM in addition to their existing courses. Some teachers were better equipped and prepared to offer TLM and the results indicated this. Regardless of the credits earned by students and the challenges experienced, all teachers and students agreed that TLM is a strong value-added resource that should be expanded to other CTS courses.

To fully develop TLM, schools and school authorities need to explore partnership opportunities with other school authorities, post-secondary institutions and industry that would allow other stakeholders to play a role in the development of CTS programs. The sharing of responsibilities and resources would better position students, teachers, parents, schools, school authorities and the greater community in meeting the changing and diverse needs of each community.

Red Deer College has created a strong Alberta CTS resource that appears to be accepted by the field. The determination of some schools who did participate in the pilot to continue use of TLM after the completion of the pilot and the interest shown in TLM by other stakeholders is a possible indication of its viability and acceptance.

Recommendations

1. **That Alberta Education pursues a partnership with Red Deer College to expand use of The Learning Manager online student assessment program into a larger pilot opportunity with additional high schools.**

Rationale: The original pilot consisted of a small number of schools and students and produced strong results and additional interest in the online resource. A larger pilot that is presented over the time of a full school year with additional upfront work may provide additional data that would assist in the determination of other opportunities for online standardized student assessment in CTS and the potential for more wide-spread student access to TLM.

The introduction of the 3400 level CTS courses in TMT and BIT in September 2009 would allow the opportunity for a larger TLM pilot to proceed and not be viewed as an 'add-on' by pilot teachers as there would not be any need to map the 'old' CTS Program of Studies to the new curriculum.

   a. **That Red Deer College examine opportunities to provide The Learning Manager to school authorities in Alberta through agreements as a tool to provide additional resources and standardized assessment for CTS teachers at the 3400 level of programming.**

Rationale: It has been indicated that some pilot schools were going to pursue use of TLM beyond this pilot and RDC was gathering information for them in order to accommodate this. Schools and school authorities outside of this pilot may be interested in exploring this opportunity if they are presented with the information and professional learning.

2. **That Red Deer College and/or other post-secondary institutions continues work to expand TLM beyond the two trades areas of carpentry and welding examined in this pilot into other 1st period apprenticeship programs.**

Rationale: The opportunities that have developed in carpentry and welding as part of this pilot have indicated that there is the potential for this resource to assist in other trade areas. Mechanics was recently developed, though not tested in this pilot and is in the introductory

stages of use to train teachers. There are other trade areas that would benefit from the adaptation of TLM for assessment and resources.

3. **That Alberta Education and Red Deer College examine the opportunity to expand The Learning Manager online student assessment program or other online student assessment program to CTS courses at the introductory, intermediate and advanced levels.**

Rationale: This resource displays characteristics that would assist in addressing concerns identified by post-secondary instructors and high school CTS teachers regarding school-awarded marks and actual student skill level that may not be reflective of course marks. Many students will not take the advanced 3400 level courses but may take other levels of CTS and apply those earned credits towards admission to post-secondary programs or to industry. Standardized student assessment of the theoretical component of the course work would assist to ensure that the mark a student earns is indicative of their actual ability, no matter which high school program in Alberta that they were registered in and assist to address the variety of training, experience and certification that CTS teachers possess. The central repository of materials in an online program such as TLM would also assist CTS teachers to find and use appropriate resources.

4. **That Alberta school authorities be actively encouraged by Alberta Education to explore partnerships and shared facility agreements with neighboring school authorities and post-secondary institutions to more effectively utilize programs, facilities, resources and personnel.**

Rationale: Many schools and school authorities have reported challenges in recruiting and retaining qualified CTS teachers and the facility and resource requirements to offer many programs are additional financial concerns. Opportunities to 'share' students, teachers and facilities needs to be openly and constructively discussed by school authorities in order to best meet the needs of individual students and Alberta Education has the opportunity to undertake a leadership role in this process.

The current AIT requirement that students who wish to challenge the 1st period journeyman exam receive their instruction from a certificated journeyman will require schools and school authorities to creatively explore partnership opportunities.

5. **That Alberta Education continue dialogue with Apprenticeship, Industry and Training (AIT), Alberta Advanced Education and Technology to address the status of students who complete the 3400 level courses through the instruction offered by a non-journeyman CTS teacher and their ability to write 1st period journeyman exams.**

Rationale: Access to journeyman CTS teachers is a challenge that many schools and school authorities are facing and this may affect opportunities for some students. Additional alternatives to permit the 'sign-off' on the skills attained and the displayed knowledge of students by journeyman instructors who were satisfied that students possess the necessary abilities would then potentially permit more students to access this AIT opportunity. The clarity of information provided to students and teachers on the opportunity to write AIT exams or the

guidelines around them will have an impact upon the number of students who register for these 3400 level courses.

This needs to be explored in order to mitigate any concerns regarding the standards of instruction that AIT may be concerned students are receiving and not diminish the status of journeyman certification in Alberta.

6. **That Alberta Education explores the opportunity with Red Deer College to assume a central leadership role in the future use of The Learning Manager online student assessment program through direct management of the process.**

Rationale: The mandate of Red Deer College is to primarily serve the region of Central Alberta and Alberta Education is better positioned for the delivery of an expanded TLM to additional high schools in the province. The expertise that Alberta Education has in the assessment of student achievement would further assist in the development of TLM and continue to serve students, teachers, parents, school authorities and the province in better meeting the individual needs of all learners.

Appendix A

The Learning Manager (TLM) Online Standardized Student Assessment
Program Background

RDC has taken an online course management tool called The Learning Manager that is registered by The Learning Management Corporation and Worldwide Interactive Network (which has an office in Calgary) and adapted the format for specific trades at the Alberta 3400 journeyman level under the new CTS curriculum that is to be implemented in two specific CTS curricular areas in September 2009: Business, Administration Finance and Information Technology (BIT) and Trades, Manufacturing and Transportation (TMT). TLM has evolved over time in various software versions from the original Computer Managed Learning (CML), to the Learning Management System (LMS) and eventually the Curriculum Information System (CIS) online programs, all which have been available for use in colleges, universities, schools and businesses for in excess of twenty years.

TLM has been used in other post-secondary institutions in Canada to deliver distance learning, support an online component of traditional classroom courses, deliver and secure online assessment, provide course grades and build collaborative course materials and other resources through use of a central repository of course content information. An advantage that TLM has over other platforms is the assessment function that provides instant standardized assessment of quizzes, tests and exams and other features which will be explained in greater detail later in this document.

TLM is described as being evolved and has evolved and directed to provide clients, either corporate or educational organizations (i.e. colleges and universities) in Canada and the U.S., with a number of 'advantages':[3]

What are the advantages of The Learning Manager® (TLM) for our organization?

Potentially significant cost savings through:

- *Reduced administrative and tracking costs*
- *Reduced need for learners to attend classes during work hours thereby less productivity downtime*
- *Reduced copying and paper costs due to online delivery of learning materials*
- *Reduced facilities overhead due to less need for classroom space*
- *Reduced travel expenses due to less need to travel to training locations*

Better resource and personnel utilization through:

- *Training staff devoting more time to training resource development rather than delivery*
- *Administrative staff spending more time on other important tasks rather than tracking training records and performing other task related to classroom training*

[3] Taken directly from the W-WIN.COM website (Italics added), *The Learning Manager*. *http://www.w-win.com/learningmanagementsystems/*

Benefits of Web-based training include:

- *Leveraging existing technology resources to provide learners with 24/7 access to training materials so training can occur anywhere, anytime*
- *Making more learning resources available to learners through online libraries - anywhere, anytime*
- *Assuring the consistency of your message because it's delivered the same way to all learners - anywhere, anytime*
- *Delivering more training to more learners with less money and resource commitment - anywhere, anytime*

Other Benefits of the original Learning Management System®:

- *Provides a full competency based training solution; track skills, competencies, and non-training-related data*
- *Understand your target audience by performing online surveys of classroom attendees' learning levels prior to class date*
- *Free video teleconferencing, audio conferencing, and presentation tools such as desktop sharing and whiteboard with the Live Action module*
- *The Report Writer allows TLM clients to customize reports featuring stored TLM data on demand*
- *Anything that can shown in an Internet browser can be shown in The Learning Manager®*
- *A full hosting solution for your Learning Management System® installation that insures that your TLM application is accessible worldwide, 24 hours a day, 7 days a week.*

The schools participating in this pilot have access to TLM under a user agreement with RDC and a site fee that is covered by Alberta Education.

Canadian Post-Secondary TLM Users

Several Canadian post-secondary institutions are currently using TLM to deliver locally developed course material including:

- British Columbia Institute of Technology (BCIT)
- Canadore College
- Lakeland College
- Laurentian University
- Lethbridge College
- Mohawk College
- Nova Scotia Community College (NSCC)
- Northern Alberta Institute of Technology (NAIT)
- Red Deer College
- Red River College
- Southern Alberta Institute of Technology
- University of British Columbia

The number of courses that are taught using TLM and the number of students accessing these opportunities varies from institution to institution. Some institutions have taken the TLM

technology and adapted components to their institution program and the program has been re-named in some instances. In other instances some institutions offer online courses that use a combination of TLM and WebCT[4] to provide different applications for each course. In many programs it frequently appears that WebCT is used to deliver content such as individual lessons or units and TLM is used in an assessment role for quizzes, tests and exams. TLM does possess features that permit content delivery, though other platforms are perhaps better developed for delivery and TLM focuses upon assessment.

A sampling of the web information on TLM use by Canadian post-secondary institutions from the above list of institutions indicates a wide variation of online learning opportunities have been integrated into their overall program delivery strategies. The institutions included in Table 1 indicate that TLM is the primary delivery strategy for the programs listed. Many other programs are provided using other alternative delivery strategies such as WebCT and correspondence delivery. It is also recognized that a majority of post-secondary institutions provide some format for online delivery learning opportunities.

Table 1: Random Sample of Post-Secondary Use of TLM

Institution	Program	Approximate Number of TLM Courses
NAIT	Academic Upgrading: Mathematics (Pure Math 30 equivalent and Technical Math/Calculus courses)	32
	Liberal Arts	1
	Building Construction and Design	12
	Health and Safety	1
	Mechanical and Industrial	15
Canadore College	Information Technology Technician	1
[redacted]		

[4] WebCT was originally developed at the University of British Columbia by a faculty member in computer science as an online proprietary virtual learning environment system that is currently sold to post-secondary institutions. Instructors can add tools such as discussion boards, mail systems, live chat and content items such as documents and web pages. WebCT is now owned by Blackboard. http://www.blackboard.com/

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	Health and Safety	1
	Mechanical and Industrial	15
Canadore College	Information Technology Technician	1
Nova Scotia Community College	Science	4
	Business Administration	11
	Early Childhood Education	11
	Funeral and Allied Health Services	9

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	General Interest	5
	Gas Process Operations	4
	Human Services	6
	Prior Learning	1
	Safety Programs	3
	Apprenticeship	222

TLM is used fairly extensively by post-secondary institutions, either as a stand-alone platform or in conjunction with other applications. This may be due to post-secondary institutions recognizing alternate delivery methods as a tool through which to engage a variety of learners at different times and in different locations. The financial resources and staffing requirements to develop TLM and other online programs for the locally-developed courses appear to have some degree of priority with post-secondary.

High School TLM User

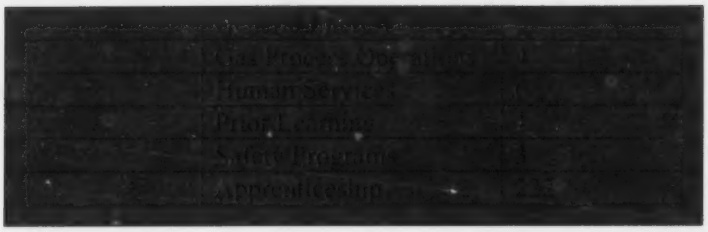
There is only one high school in all of North America outside of this pilot project that uses TLM to deliver course material to students. Banting Memorial High School, Simcoe County District School Board in Alliston, Ontario is a Grade 9 to 12 school of 1800 students in a primarily rural area that has utilized TLM for approximately six years.

The program at Banting Memorial High School began with a teacher who was familiar with the online application and wished to undertake the opportunity for alternative delivery methodology in Math. In a short period of time all of this teacher's Math courses utilized TLM technology. Since the retirement of this originating teacher, TLM has been adopted by the alternative school within the school's regular program for Math classes at grades 9 to 12 that are a combination of courses that are either locally developed, or at the applied, academic or college-preparation level streams in the Ontario high school curriculum. Currently there are thirty students at this school who have access to TLM.

The school principal, when asked how the students, parents and teachers have responded to TLM, stated, *"They love it!"* However, the principal also provided a caution indicating that it has taken a considerable amount of time and effort to create the questions that are appropriate for the grade level and course and this is the primary reason why the program did not originally expand beyond one teacher. The need to review the curriculum, develop the appropriate question set at the unit level and validate them was viewed as, *"Too much for one school to handle and no other takers within the district were willing to assist."*

This explanation may provide insight into why other schools or districts have not attempted to implement TLM at the high school level.

Banting is considering expanding the TLM program on its own once the school becomes fully wireless and the computer compliment increases. The central question in this program vision will be the allocation of the staff and budget necessary to expand the online offering. It is interesting to note that Banting currently uses TLM as more of a self-directed learning model accessed within the school day and has not yet fully explored the opportunity for student access at times or locations outside of school hours.



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The Learning Management Corporation and Worldwide Interactive Network are not aware of any post-secondary institutions that provide course material for delivery to high school students outside of the pilot project that Red Deer College and Alberta Education are collaborating on, nor are they aware of any other high school or K-12 school authority in North America using this program.

Other online educational programs currently available to Alberta students such as the St. Gabriel Cyber School through Greater St. Albert Catholic Schools and Red Deer Catholic Schools use a different online operating format. This program uses FirstClass Client[5] and Skype[6] to provide online educational delivery through email, text chat and video conferencing. All assessments are completed through email delivery of the quiz, test or exam from the teacher to the student and then back to the teacher for grading. As such, this system serves a different purpose than TLM and does not have standardized assessment capability.

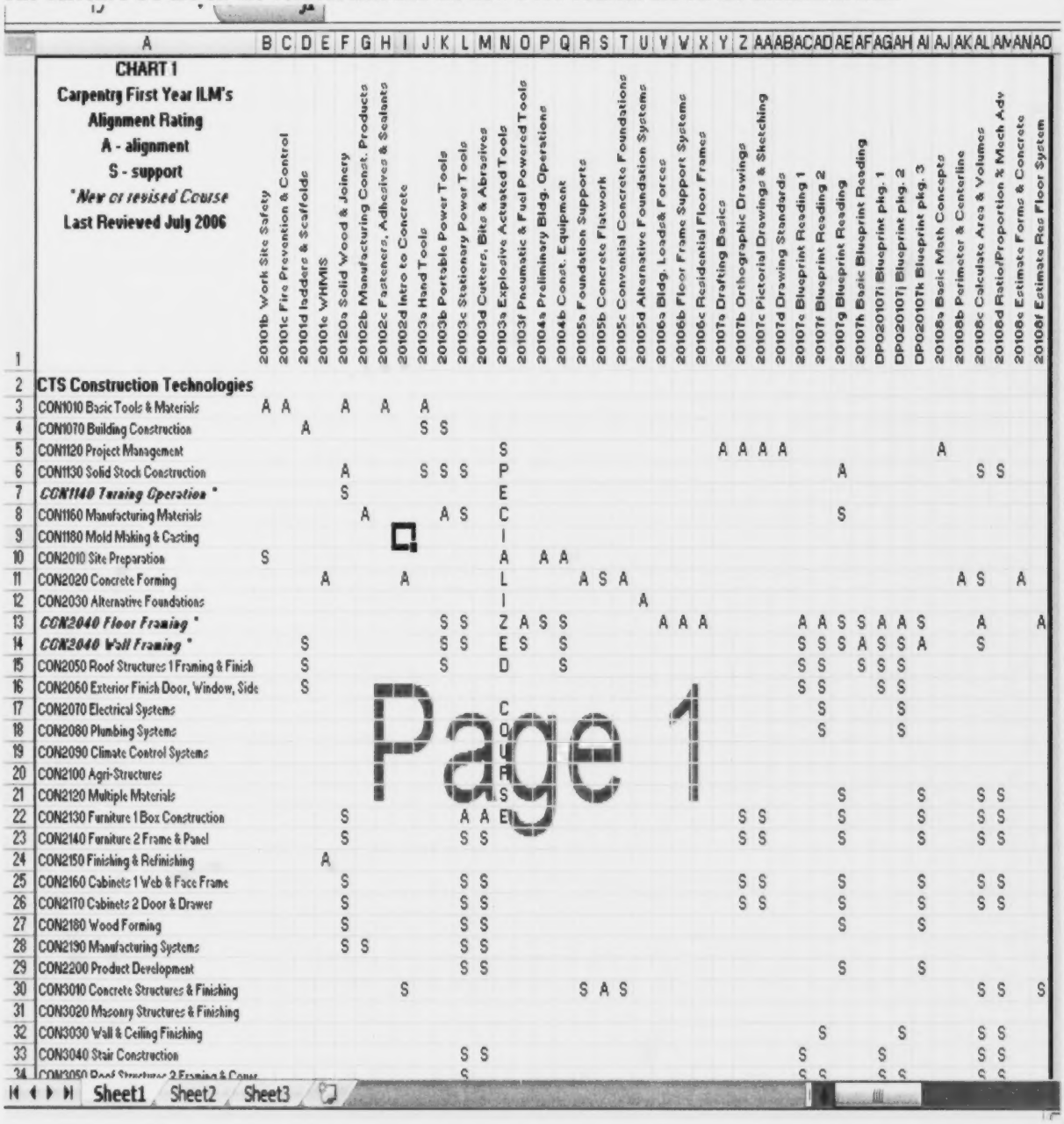
[5] Commercial service provided by Open Text Corporation that offers student email, social networking, collaborative conferences and work spaces, assignment calendars and scheduling, podcasting and file storage for educational users.
http://www.firstclass.com/ResourcesFolder/ResourcesPDFs/FirstClass%20Collaboration%20Suite%20Education.pdf/?Plugin=FC

[6] Commercial service provided by Skype Limited that offers audio contact, instant messaging, video call and conferencing capabilities. http://www.skype.com/business/features/calling/

Appendix B

Carpentry and welding Alignment Charts: the new 3400 level (introduction September 2009) to the current CTS courses

The current POS are on the vertical axis and the new 3400 courses are on the horizontal axis.



	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK	AL	AM	AN	AO
1	**CHART 1** **Carpentry First Year ILM's** **Alignment Rating** **A - alignment** **S - support** ****New or revised Course*** **Last Reviewed July 2006**	20101b Work Site Safety	20101c Fire Prevention & Control	20101d ladders & Scaffolds	20101e WHMIS	20120a Solid Wood & Joinery	20102b Manufacturing Const. Products	20102c Fasteners, Adhesives & Sealants	20102d Intro to Concrete	20103a Hand Tools	20103b Portable Power Tools	20103c Stationary Power Tools	20103d Cutters, Bits & Abrasives	20103e Explosive Actuated Tools	20103f Pneumatic & Fuel Powered Tools	20104a Preliminary Bldg. Operations	20104b Const. Equipment	20105a Foundation Supports	20105b Concrete Flatwork	20105c Convential Concrete Foundations	20105d Alternative Foundation Systems	20106a Bldg. Loads& Forces	20106b Floor Frame Support Systems	20106c Residential Floor Frames	20107a Drafting Basics	20107b Orthographic Drawings	20107c Pictorial Drawings & Sketching	20107d Drawing Standards	20107e Blueprint Reading 1	20107f Blueprint Reading 2	20107g Blueprint Reading	20107h Basic Blueprint Reading	DP020107i Blueprint pkg. 1	DP020107j Blueprint pkg. 2	DP020107k Blueprint pkg. 3	20108a Basic Math Concepts	20108b Perimeter & Centerline	20108c Calculate Area & Volumes	20108d Ratio/Proportion % Mech Adv	20108e Estimate Forms & Concrete	20108f Estimate Res Floor System
2	**CTS Construction Technologies**																																								
3	CON1010 Basic Tools & Materials	A	A			A		A		A																															
4	CON1070 Building Construction			A						S	S																														
5	CON1120 Project Management													S											A	A	A	A							A						
6	CON1130 Solid Stock Construction					A				S	S	S		P																A								S	S		
7	***CON1140 Turning Operation ****					S								E																											
8	CON1160 Manufacturing Materials						A				A	S		C																S											
9	CON1180 Mold Making & Casting													I																											
10	CON2010 Site Preparation	S												A		A	A																								
11	CON2020 Concrete Forming				A				A					L				A	S	A																		S		A	
12	CON2030 Alternative Foundations													I							A																				
13	***CON2040 Floor Framing ****										S	S		Z	A	S	S					A	A	A				A	A	S	S	A	S					A			A
14	***CON2040 Wall Framing ****			S							S	S		E	S		S											S	S	S	A	S	S	A			S				
15	CON2050 Roof Structures 1 Framing & Finish			S							S			D			S											S	S		S	S	S							
16	CON2060 Exterior Finish Door, Window, Side			S																								S	S			S	S							
17	CON2070 Electrical Systems													C															S				S							
18	CON2080 Plumbing Systems													O															S				S							
19	CON2090 Climate Control Systems													U																											
20	CON2100 Agri-Structures													R																											
21	CON2120 Multiple Materials													S																S				S			S	S		
22	CON2130 Furniture 1 Box Construction					S						A	A	E													S	S		S				S			S	S		
23	CON2140 Furniture 2 Frame & Panel					S						S	S														S	S		S				S			S	S		
24	CON2150 Finishing & Refinishing				A																																			
25	CON2160 Cabinets 1 Web & Face Frame					S						S	S														S	S		S				S			S	S		
26	CON2170 Cabinets 2 Door & Drawer					S						S	S														S	S		S				S			S	S		
27	CON2180 Wood Forming					S						S	S																	S				S						
28	CON2190 Manufacturing Systems					S	S					S	S																											
29	CON2200 Product Development											S	S																	S				S						
30	CON3010 Concrete Structures & Finishing								S									S	A	S																		S	S		S
31	CON3020 Masonry Structures & Finishing																																							
32	CON3030 Wall & Ceiling Finishing																												S			S					S	S		
33	CON3040 Stair Construction											S	S															S					S					S	S		
34	CON3050 Roof Structures 2 Framing & Cover											S																S	S				S	S				S	S		

Page 1

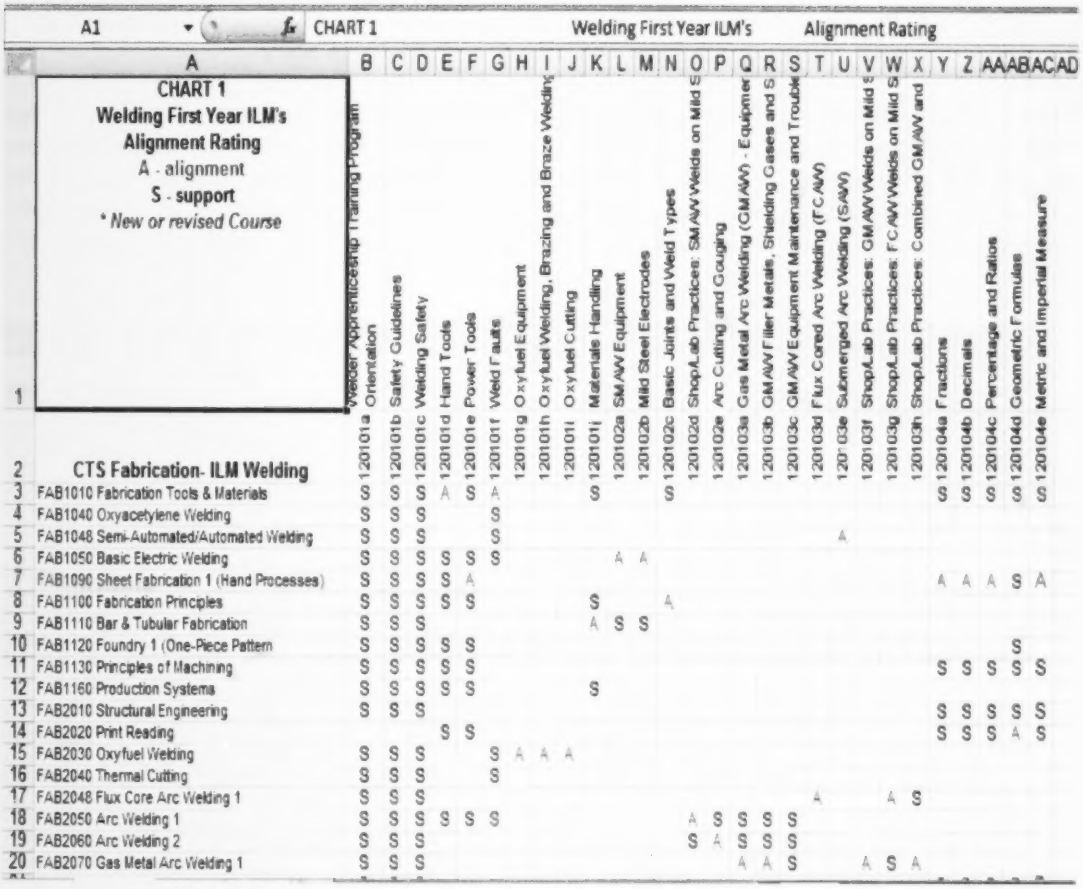
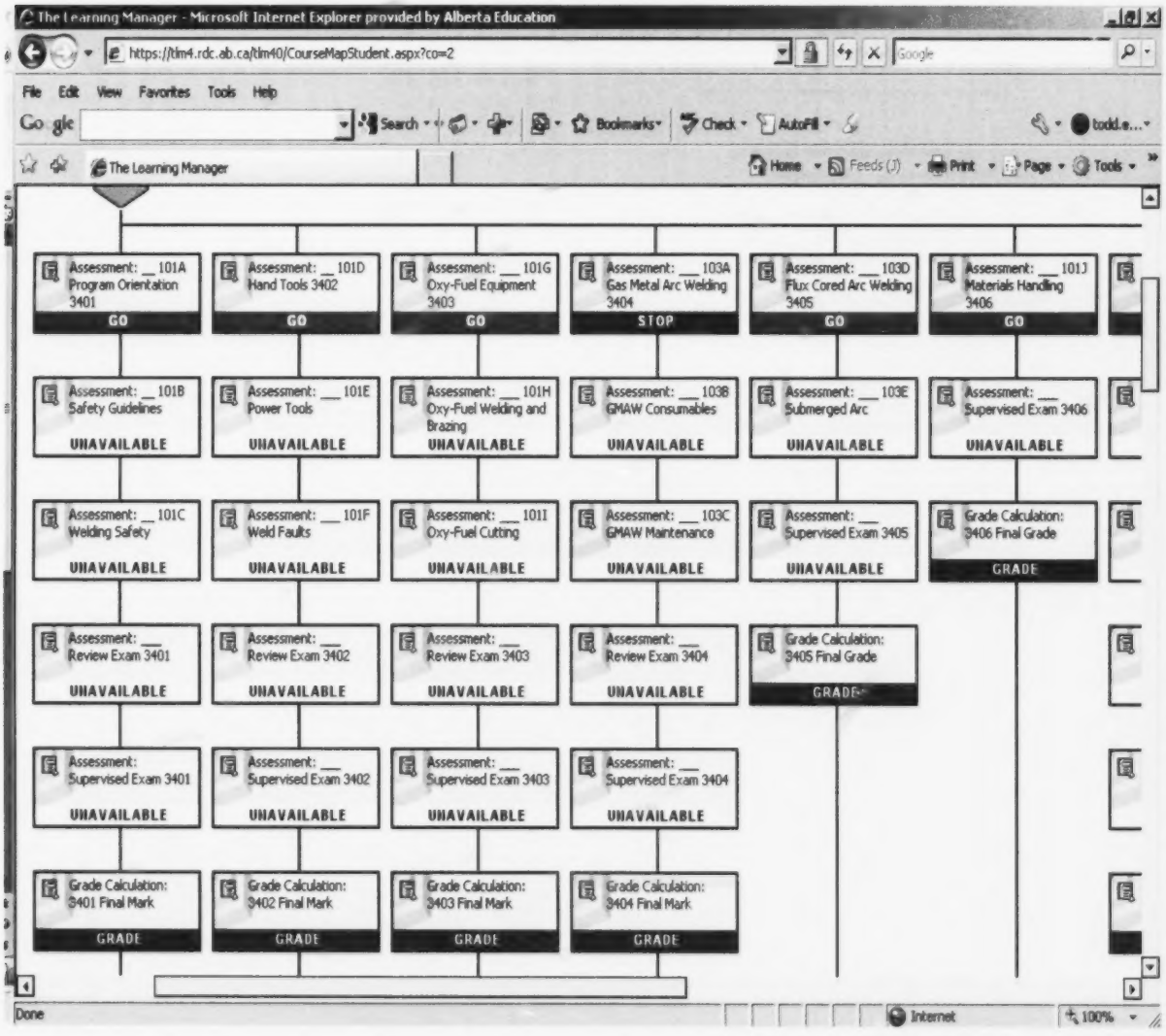


CHART 1 Welding First Year ILM's Alignment Rating A - alignment S - support * New or revised Course	Welder Apprenticeship Training Program Orientation	Safety Guidelines	Welding Safety	Hand Tools	Power Tools	Weld Faults	Oxyfuel Equipment	Oxyfuel Welding, Brazing and Braze Welding	Oxyfuel Cutting	Materials Handling	SMAW Equipment	Mild Steel Electrodes	Basic Joints and Weld Types	ShopLab Practices: SMAW Welds on Mild S	Arc Cutting and Gouging	Gas Metal Arc Welding (GMAW) - Equipmer	GMAW Filler Metals, Shielding Gases and S	GMAW Equipment Maintenance and Trouble	Flux Cored Arc Welding (FCAW)	Submerged Arc Welding (SAW)	ShopLab Practices: GMAW Welds on Mild S	ShopLab Practices: FCAW Welds on Mild S	ShopLab Practices: Combined GMAW and	Fractions	Decimals	Percentage and Ratios	Geometric Formulas	Metric and Imperial Measure
CTS Fabrication- ILM Welding	120101a	120101b	120101c	120101d	120101e	120101f	120101g	120101h	120101i	120101j	120102a	120102b	120102c	120102d	120102e	120103a	120103b	120103c	120103d	120103e	120103f	120103g	120103h	120104a	120104b	120104c	120104d	120104e
FAB1010 Fabrication Tools & Materials	S	S	S	A	S	A				S			S											S	S	S	S	S
FAB1040 Oxyacetylene Welding	S	S	S			S																						
FAB1048 Semi-Automated/Automated Welding	S	S	S			S															A							
FAB1050 Basic Electric Welding	S	S	S	S	S	S					A	A																
FAB1090 Sheet Fabrication 1 (Hand Processes)	S	S	S	S	A																			A	A	A	S	A
FAB1100 Fabrication Principles	S	S	S	S	S					S			A															
FAB1110 Bar & Tubular Fabrication	S	S	S							A	S	S																
FAB1120 Foundry 1 (One-Piece Pattern	S	S	S	S	S																						S	
FAB1130 Principles of Machining	S	S	S	S	S																			S	S	S	S	S
FAB1160 Production Systems	S	S	S	S	S					S																		
FAB2010 Structural Engineering	S	S	S																					S	S	S	S	S
FAB2020 Print Reading				S	S																			S	S	S	A	S
FAB2030 Oxyfuel Welding	S	S	S			S	A	A	A																			
FAB2040 Thermal Cutting	S	S	S			S																						
FAB2048 Flux Core Arc Welding 1	S	S	S																A			A	S					
FAB2050 Arc Welding 1	S	S	S	S	S	S								A	S	S	S	S										
FAB2060 Arc Welding 2	S	S	S											S	A	S	S	S										
FAB2070 Gas Metal Arc Welding 1	S	S	S													A	A	S			A	S	A					

Appendix C

TLM Welding Screen Shot

This screen shot indicates some of the modules that are available for welding. The green band indicates modules that students are able to access initially, allowing them to then proceed down the vertical axis, writing a quiz for each module. The red band for 3404 indicates a course that the student must receive permission from the CTS teacher in order to begin. If a student fails a review quiz three times for any module, they are 'locked out' until they meet with their CTs teacher.



Appendix D

Pilot Teacher and Student Interview Responses

Individual interviews were conducted with each teacher involved in the pilot, a number of participating students and with school administrators. One administrator provided email responses to the questions that have been incorporated into the overall responses. As such, the set questions for all teacher and administrator respondents are presented as follows:

1. How has the online TLM program benefitted:
(a) You as a teacher
(b) Your students
2. What value do you see for use of this online program by non-journeyman CTS teachers?
3. What do you believe is the potential for expansion of this online resource?

Teacher Responses

1. How has the online TLM program benefitted:

(a) You as a teacher

- the online system works well
- the school authority is willing to upgrade the facility to make it more usable
- access to strong, pre-made resources that are current
- an almost one-stop resource
- the software is excellent
- supervised test is a 'snap'
- the program can be confusing when not used all the time
- may increase the workload for teachers
- this program could replace the regular program
- good relationship with RDC
- see 3400 courses as an injection of energy to continue to offer students relative learning opportunities at outreach and TLM has been a great assist
- number one is assessment standards…the link to advanced learning makes the testing respectful and meaningful
- the ease of operation is appreciated

(b) Your students

- students might be floundering because they are on their own to work on the modules
    - the lay-out of the lab is the main problem due to the lack of classroom space and computers. Students have to use the library and the distance and the lack of me being there to work with them is a significant issue
- students are very interested in being able to move ahead
- some students are very motivated to take the RDC program
- they have access to up-to-date resources for their trade
- all materials are to industry standards
- helps to challenge the students who are capable
- some of the wording in the questions is not clear and in a few cases there was not any connection between the test questions and the written module work

- not enough time for a balance of the theoretical and practical work
- students need to have a regular study period scheduled to assist them
- time is a factor when trying to complete the theoretical and practical work
- some students see it as balanced
- need to schedule separate lab and classroom time
- problems with the online program at the start of the semester, but they seem to have been taken care of. It took a few weeks to get them ironed out
- the TLM has been a strong tool for our outreach student
- aspects of the online test have been a 'wake-up' call for our student and he has responded well
- our outreach student is proud of his work with the online

2. **What value do you see for use of this online program by non-journeymen CTS teachers?**

- it really depends upon AIT and how they approach non-journeymen
- you really do not need journeymen to teach 1st period apprenticeship
- non-journeymen are provided additional resources that could be beneficial
- non-journeymen teachers tend to set-up courses so that their students avoid any problems, whereas journeymen are taught to teach problems to allow students to develop skills to work through them
- students need to see and understand the dangers involved in their trade
- gives them exposure to industry material
- access to industry test bank questions
- you cannot buy this resource like you can with other subject areas
- these are stronger questions to challenge students
- very time consuming to construct your own tests
- RDC has done a great job
- the average non-journeymen may need additional assistance
- non-journeymen teachers learn on the job to try and stay ahead of their students
- concessions need to be made to encourage journeymen into the education program
- ensure that all supporting information is provided for the modules
- concern with the gap in students coming from other schools (their previous 90% is the equivalent of a 45% in my program…they just do not have the skills that they are supposed to if they have already finished the modules that their previous school said that they did)
- TLM is beneficial to anyone
- non-journeymen need additional resources and support
    - PD in the summer is a must
    - Who pays for the support
    - non-journeymen <u>need</u> to take courses

3. **What do you believe is the potential for expansion of this online resource?**

- great potential to expand under the right lab and facility conditions
- can be a challenge for non-journeymen
- may push these non-journeymen to expand their own skills
- strong practical PD for these teachers would be required

- lack of journeymen to ask for assistance is an issue for non-journeymen
- the mark gap between some schools is overwhelming…where do they get-off giving such high marks to a student who cannot complete the skill?
    - some marks are just not justified and this is causing us some significant issues when students from other schools transfer into our program
- the potential to expand this is significant
- issues at the 3400 level with the few number of students who are able to take this
- need to expand the resources to make this work in a small school
- need to expand the resources that are available on TLM that can be downloaded for class (i.e. videos, pictures, assignments)
- funding is an issue especially in small school
    - central office is skimming a lot of money off of the top and it is making it tough at the schools
    - there are far too many people working in central office in a board that is so small
- limited by the facility and instructors
- this program could expand to other trades
- needs to be monitored closely
- could be a plus to keep more students in school
- Gr. 10s are excited to hear about this for their Gr. 11 year
- This could be and should be expanded to all other course levels in CTS
- The 3400 level welding course through TLM is a very challenging course with high expectations of the learner. Students quickly figure out that there is an abundance of material that needs to be learned and understood. It is an eye-opener for students who have no idea what to expect from a college level course.
- From what I have witnessed students will rise to the challenge knowing that more is expected of them. The difficulty level gives credibility to the vocation and makes students realize just how much an apprentice welder is expected to know.

Student Responses

Conversations with students were more informal and did not follow a set of pre-determined questions, but were led by the student responses to previous questions. The responses for one student were forwarded electronically by the school administrator and have been incorporated into the other interview responses.

Not all student conversations involved those who were participating in the pilot as some students were aware of TLM, but were not part of the program. Some conversations with specific students took place due to their previous experiences at other high schools or to gauge their perceptions of a program that was potentially "down the road" for them.

Student responses:

- has taken all of the welding courses at school that he possibly can
- the RDC modules are challenging and he enjoys the opportunity
- a lot of reading, but he knows that it is part of it
- has been taking welding at school since Grade 9, but he has been welding at home all of his life
- has learned all of the industry safety guidelines that he did not know before

- some industry standards in other areas are new to him
- it has been a lot of work
- I am going to apprentice at a shop in Calgary and have already been offered a job with them
- need to have computers in the shop because it is not good when I have a question and the shop is on the other side of the school
- challenging and a lot of reading
- it is tough to get the work done in class and to then get all of the reading done at home
- likes the challenge
- it is neat that I am able to do this while still in high school
- my friends want to take this next year
- a standardized test means that this is an important subject
- the questions are tough, but I can then read through the book again to find it and it is a lot easier to do this than some of the other classes
- there just isn't enough time in class to get it all done
- it is laid-out and easy to follow for the most part
- my teacher is great with it
- like the modules
- the modules are easy to understand
- I like it immediately telling me what I got right or wrong and going online
- the tests are worded so I can understand the questions
- this is not easy stuff. You have to study and know it or you will not pass. The online tests are tough and it is an exam that means a lot
- I don't know how I got the (high) marks that I did at my last school. I really didn't do anything in class
- I am looking forward to being able to take that next year. They are doing what I want to do
- it sounds like a tough class, but they are doing some neat things

Appendix E

Draft CTS Student Assessment Framework

The potential measures to indicate the impact of the delivery and implementation of the Revised CTS Program are in draft form in the following three tables and are taken from the document *Career and Technical Studies (CTS) Student Assessment Framework: Focus Upon Two Tasks, Draft Document 12.1* posted on the CTS Education Base website internal to Alberta Education.

Outcome	Measure
A more focused program of studies	• % of high school graduates earning credits in CTS (AE data) • Average credits earned by high school students, by type of course work in CTS (AE data) • % of student satisfaction with the CTS program taken (Survey) • % of students satisfied with the CTS strands offered at their school (Survey)
Updated resources	• % of CTS teachers satisfied that the curricular resources provided to them meet the needs of their students in the new program (Survey)
Enhanced access to programming	• Number of students who have a course completion record in CTS (AE data) • Average credits earned by high school students in CTS, by grade (AE data) • Average credits earned by high school students, by subject area (AE data) • % of high school graduates who enrolled in post-secondary education or training within 2 years after graduation (AE data) • Number of external credentials that are available for students (School and jurisdiction data) • Number of external partnerships developed between districts and other organizations (School and jurisdiction data) • Number of schools registered as a Skills School through Skills Canada (Skills Canada data)
Professional learning opportunities for CTS teachers	• % of CTS teachers reporting use of computer and technology related instruction to enhance their professional learning (Survey) • % of CTS teachers reporting that their professional learning has improved the learning opportunities of their students in the new CTS program • % of teacher satisfaction with pre-service preparation

	for CTS (Survey) • % of teacher satisfaction with in-service preparation for CTS (Survey) • % of teachers trained using a variety of assessments including use of rubrics to measure performance (Survey)
Certification of specialist teachers	• Number of teachers teaching CTS courses (School data) • % of time that teachers spend teaching CTS (FTE) (School data) • Number of teachers trained in (university major or minor)and teaching in CTS in the province (School data) • Number of CTS teachers who have journeyman certification (School data) • % of teachers holding specialized credentials in areas of CTS program delivery other than journeyman (School data) • Number of teachers supervising CTS instructors (School data) • % of FTE involved for teachers supervising CTS instructors (School data) • Qualifications of the teacher supervising CTS instructors (School data)
Facilities and equipment to acceptable standard	• % of CTS labs that have experienced structural upgrades (School data) • % of equipment ever-greened in the school CTS labs (Survey) • Number of shared facility arrangements for CTS labs between schools or other organizations (School data) • Number of mobile CTS labs in use by jurisdictions (Jurisdiction data)

The potential measures for the assessment of student achievement in the Revised CTS Program are in draft form and presented as follows:

Outcome	Measure
	• Student self-assessment of their learning, administered at the completion of each module (Direct measure, developed by classroom teacher) • Assessment of a student learning portfolio submitted at the end of a semester program (i.e. 4-5 modules) (Indirect measure, developed by classroom teacher, school and/or jurisdiction) • % of students satisfied with assessment practices used in

	CTS courses (Survey) • % of teachers using performance data (i.e. needs assessment, performance measures, student surveys) to improve student achievement (Survey) • % of students completing assignments that require them to demonstrate relevant academic skills and to solve problems through projects (Survey) • % of students able to incorporate academic and technical skills needed within the occupational area of study (Survey) • % of students completing apprenticeship courses in CTS (AE data) • Number of students that complete a credentialed pathway (AE data) • Number of students that complete an external credential (School data) • High School completion rates calculated on a 3, 4 and 5 year cycle (AE data)[7] • Student absenteeism rate (School data)[8] • Number of students who attained the level of excellence in regional, provincial and national skills competitions (Skills Canada data) • The number of students who access a online test provided by the Regional Trades Initiative in carpentry or welding following the completion of a grouping of courses (Red Deer College data)

[7] And [9]: These measures are not intended to indicate that any improvement in school completion or student absenteeism rates are the sole result of a CTS initiative taken in isolation. Improvements in the rate of these two measures would be a reflection of multiple strategies developed by many education and community stakeholders, of which CTS does have an opportunity to impact in a positive manner. It is also noted that many student CTS assessment measures are a reflection of learning opportunities obtained over the course of a young person's educational career and life experiences.